In the Drawings:

Permission is requested to amend Figures 13-15 as seen in red ink on the attached drawings.

REMARKS

Reconsideration of the above-identified application in view of the amendments above and the remarks following is respectfully requested.

Claims 1, 2, 5-8, 10, 13, 16, 19, 21-23, 28, 30, 31, 37-39 and 41-48 are in this case. Claims 1, 2, 5-8, 10, 13, 16, 19, 21-23, 28, 30, 31, 37-39 and 41-48 have been rejected. Claims 1, 2, 5-8, 10, 13, 16, 19, 21-23, 28, 30, 31, 37-39 and 41-48 have now been cancelled. New claims 49-102 have been added.

35 U.S.C. § 112 Rejections

The Examiner maintains the rejection of claims 45 and 47 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. Claims 45 and 47 have now been cancelled thereby rendering moot the Examiner rejection with respect thereto.

35 U.S.C. § 102 Rejections

The Examiner maintains the rejection of claims 1, 2, 5-7, 16, 21, 23, 28, 30, 31 under 35 U.S.C. § 102(b) as being anticipated by Kane and of claim 22 under 35 U.S.C. § 102(b) as being anticipated by Field et al. The Examiner further rejects claims 37-39 under 35 U.S.C. § 102(a) as being anticipated by Science Dimension and NIST.

With respect to claims 1, 2, 5-7, 16, 21, 23, 28, 30, 31, the Examiner refers to the previous amendment to claim 1 stating that the electron wave function overlap, J(r), which is either 0 in one state, or greater than zero in the other state, is determined via the J-Gate by the electric field of the particle charge distribution in space.

With respect to claim 22, the Examiner states that the quantum dot of Field et al. is within the scope of the two regions container.

With respect to claims 37-39, the Examiner states that Science Dimension and NIST disclose a particle having a wave function bound to a region, which is embodied as a ground state electron in a cesium atom in an atomic clock. The Examiner interprets the excitation of the cesium atoms as the switching of the particle from a first lower energy state in which the wave function of said particle has a first small extent to a second higher energy state in which the wave function of the at least one particle has a second larger extent. The Examiner further states that claims 8, 10, 19, 41 are with the scope of a cesium atom in an atomic clock.

The Examiner rejections are respectfully traversed. Claims 1, 2, 5-8, 10, 13, 16, 19, 21-23, 28, 30, 31, 37-39 and 41-48 have been cancelled and new claims 49-102 have been added.

The claims before the Examiner are directed to a switch device having a first state and a second state. The claimed switch device is the first practical implementation of a quantum mechanical phenomenon according to which the size of the wavefunction of a particle is increased when the particle's energy is increased. In its simplest configuration, the claimed switch device comprises a cavity occupied by one or more particles described by a wavefunction. At low energy, the wavefunction occupies a certain part of the cavity and when the energy of the particles is increased, the wavefunction grows in size, spread within the cavity and occupies a greater part or the entire cavity. The states of the device are defined by the spatial size of the wavefunction or, equivalently, by the portion of the cavity being occupied by the wavefunction. Specifically, the first state (say, the "0" state) is defined as the state in which the wavefunction only partially occupies the cavity, and the second state (say, the "1" state), is defined as the state in which the wavefunction occupies a greater part or the entire cavity in one or more dimensions.

The claimed switch further comprises a mechanism for changing the energy of the particle to effect a change in the spatial size of the wavefunction, hence to switch between the first state and the second state of the device. The mechanism can be photon or phonon emitter outside the cavity, or it can be configured to change the electric potential energy of the particle.

Kane's device operates on the principle of exchange energy between the electron and the nucleus. Kane teaches the application of global magnetic field for generating the hyperfine split. Kane also teaches application of energy for establishing an overlap between wavefunctions.

Applicant wishes to point out that according to various exemplary embodiments of the present invention the identification between the states in the claimed invention is due to a change in the electric potential energy, a phrase which is commonly used in the classical electricity. The equivalent phrase for the electric potential energy in quantum mechanics is the direct term. Such type of energy is proportional to the square of the absolute value of the charge density.

In Kane's device, on the other hand, the exchange energy is used. This type of energy is proportional to the charge density overlap of two different particles, and not to the square of the absolute value of the charge density. It is noted that the exchange energy is a quantum mechanical quantity which has no classical equivalence.

It is therefore the Applicant's strong opinion that Kane teaches away from the claimed invention.

Applicant further wishes to point out that the exchange energy significantly differs from the electric potential energy or direct term, from several reasons.

Firstly, the exchange energy has an opposite sign compared to the electric potential energy. Secondly, the exchange energy can only be realized when there is an overlap between the wavefunctions of two or more particles, whereas the energy corresponding to the direct term can be increased or decreased without overlapping wavefunctions. Thus, the electric potential energy can influence on a larger distance compared to the exchange energy and on charges that differ on their energies or charge sign as well. Thirdly, Kane's exchange energy is spin-dependent it appears only when the charges have the same spin, whereas the electric potential energy does not depend on the spin sign. Fourthly, in most cases the electric potential energy is considerably larger in magnitude compared to the exchange energy. These differences enable a device based on electric potential energy to operate at larger temperatures and be less sensitive to noise.

Science Dimension and NIST cited in the Office Action, have been carefully reviewed but are deemed not to anticipate nor render obvious Applicant's claims, either singly or in combination, because the above references do not teach or imply a switch device in which the states are defined in terms of the spatial size of the wavefunction.

With reference to Field et al., this reference teaches a tunneling effect within a laterally confined quantum dot. In Field et al., the switching is achieved when an electron changes its location inside one region. Field et al., however, fail to teach any growth of the wavefunction. Field et al. further fail to teach a device having electrode which is disposed on a one region of the cavity and which generates a signal (*e.g.*, change in potential or current) when the particle occupies this region.

With reference to Science Dimension and NIST, these references teach transition of atoms and electrons to higher level of energy, but do not teach any change in the spatial size of the wavefunction. Applicant wishes to emphasize that although the wavefunctions described

in Science Dimension and NIST may extend over a particular region in space, Science Dimension and NIST do not teach that the spatial sizes of the wavefunctions is changed, nor do they teach a switching device in which the different states of the device are based on different sizes of the wavefunction. A particular feature of the claimed invention is that when the device is in its first state the wavefunction extends over one region, and when the device is in its second state the wavefunction extends over another region, typically larger.

In view of the above amendments and remarks it is respectfully submitted that the claims are now in condition for allowance. Prompt notice of allowance is respectfully and earnestly solicited.

Respectfully submitted,

Martin D. Moynihan,
Registration No. 40,338

Date: September 5, 2006

Enclosed:

Petition for Extension of Time
Figures 13-15
Revocation of POA with New POA

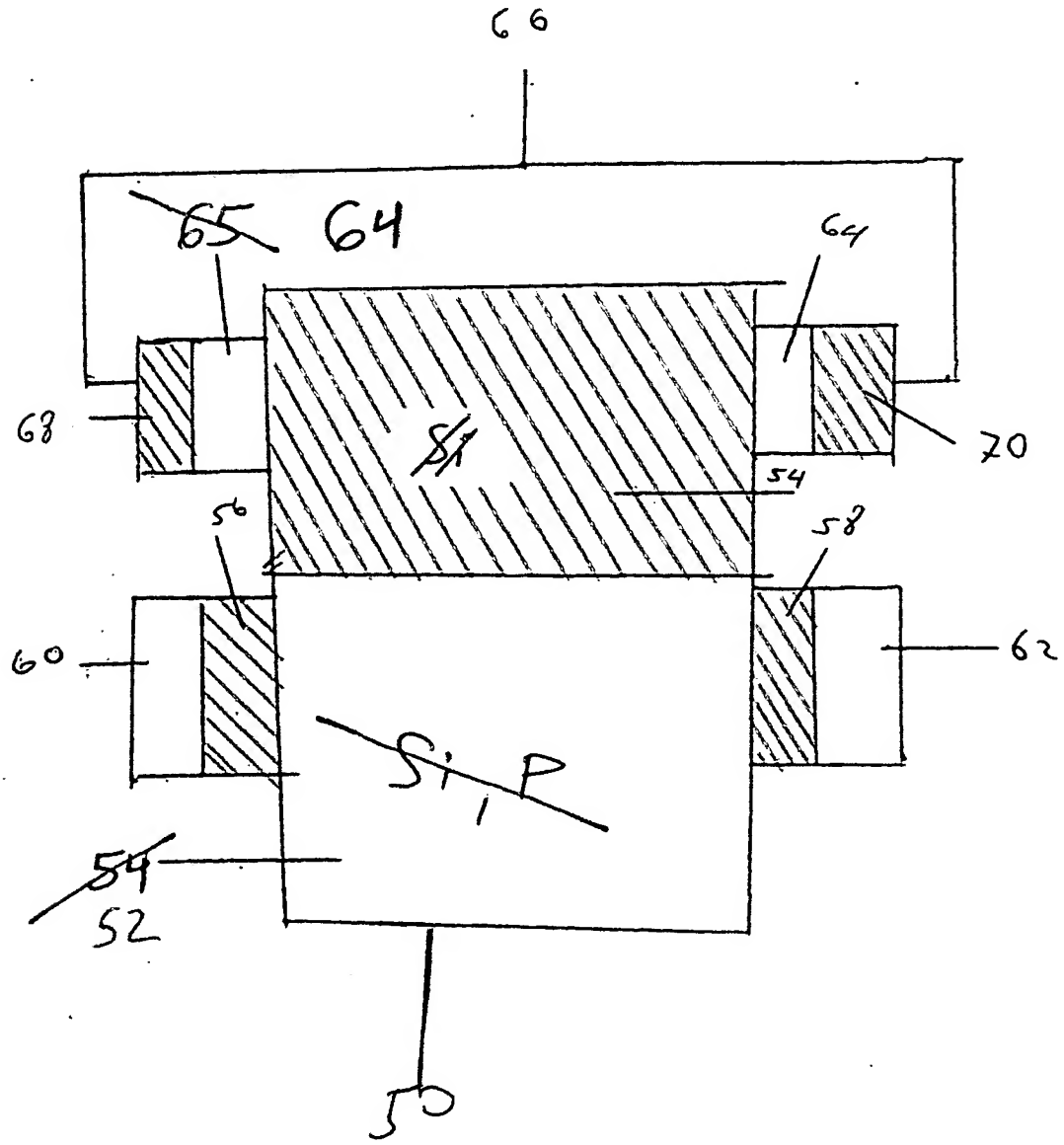

Fig. 13

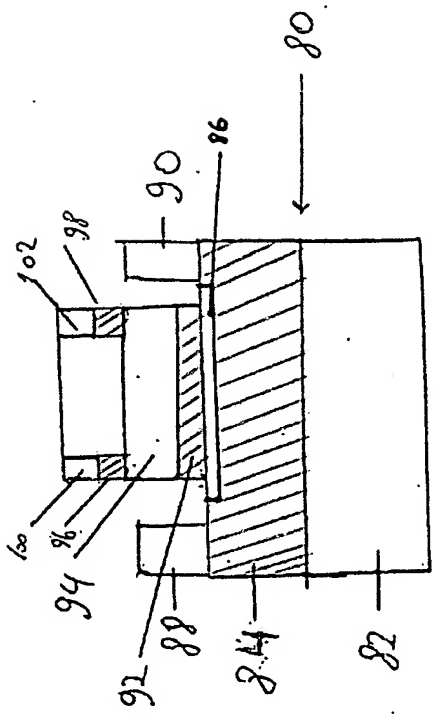

Fig. 14

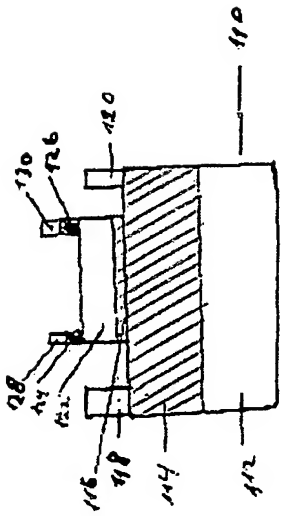

Fig. 15

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